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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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EXAMINER

IM52/1009

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ART UNIT

PAPER NUMBER

1762

DATE MAILED:

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Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.
09/125,128

Applicant(s)
Iguchi et al.

Examiner
Michael Cleveland

Art Unit
1762



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on Aug 22, 2001

2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 35 C.D. 11; 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) 1-31, 33, 35, 37-41, 43-46, 48-51, and 53-58 is/are pending in the applica

4a) Of the above, claim(s) _____ is/are withdrawn from considera

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) 1-31, 33, 35, 37-41, 43-46, 48-51, and 53-58 is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claims _____ are subject to restriction and/or election requirem

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

a) ☐ All b) ☐ Some* c) ☐ None of:

- 1. ☐ Certified copies of the priority documents have been received.
- 2. ☐ Certified copies of the priority documents have been received in Application No. _____
- 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- 15) ☐ Notice of References Cited (PTO-892)
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____
- 18) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other:

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DETAILED ACTION

Continued Prosecution Application

1. The request filed on 8/22/01 for a Continued Prosecution Application (CPA) under 37 CFR 1.53(d) based on parent Application No. 09/125128 is acceptable and a CPA has been established. An action on the CPA follows.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 13, 20, 35, and 44 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 13: The phrase “said phosphor pastes capable of emitting different colors” lacks proper antecedent basis. The Examiner recommends deleting “said” or amending to state “...said phosphor pastes are capable...and are discharged...”

Claim 20: The term “50 wt% grain size” is unclear. The Examiner has interpreted the claim as stating “wherein 50 wt. % of each phosphor powder has a grain size of 0.5 to 10 microns...”. If such is Applicant’s intent, the examiner recommends changing the claim to so state. If not, Applicant should clarify the meaning of the term and provide support for the asserted meaning.

Claims 35 and 44: Apparatus claims must depend only on the characteristics of the apparatus and not on the intended use of the apparatus. Thus, claims 35 and 44 are vague and indefinite because, if the claims were granted, infringement would necessarily be determined in part by the features of the substrate and/or intended use of the apparatus.

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4. Claim 3 is objected to because of the following informalities: In claim 3, line 3 “(D)” should be “(D)”.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

6. Claims 1-2, 4, 9, 16, 22, and 31 are rejected under 35 U.S.C. 102(e) as being anticipated by Shinoda et al. (U.S. Patent 5,674,553, hereafter ‘553).

‘553 teaches a method of applying a phosphor paste containing a phosphor powder and an organic solvent through a plurality of outlet holes onto a substrate with a plurality of barrier ribs to form a phosphor layer (col. 19, line 66-col. 20, line 7 and Figs. 22A-C). Three pastes may be used to form red, green, and blue stripes. The pastes are then heated to form the phosphor layers (col. 20, line 35-48). ‘553 teaches that the desired phosphor film thickness is preferably from 10-50 microns (col. 19, lines 33-48). While there is no teaching regarding the ratio of the thickness of the layer on the bottom (T1) and the side wall (T2), any values independently chosen from the range necessarily produce a ratio of $0.2 \leq T1/T2 \leq 5$.

Claim 4: A screen printer is a paste applicator with a plurality of holes in a flat screen.

Claim 9: The openings are formed at a pitch triple that of the ribs (col. 19, lines 61-65).

Claim 16: The phosphors are applied consecutively and dried (col. 20, lines 36-48).

Claim 22: The paste may include a cellulose resin (col. 20, lines 5-7).

Claim 31: The ribs may be black on top (col. 12, lines 59-64).

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Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 3, 5-7, 11, 21, 26, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over '553.

'553 does not teach Applicant's specifically claimed ranges of the number of outlet holes, the spacing between barrier ribs, the diameter of the outlet holes, the paste composition, the barrier rib characteristics, and phosphor layer thickness.

Claim 30: The width and pitch of the ribs control the resolution of the display panel. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have optimized them for the desired resolution. '553 explicitly teaches a barrier pitch of 220 microns, widths of 40-80 microns (col. 19, lines 49-60) and height of 100 microns (col. 19, line 8-17).

Claims 3 and 11: As described above, '553 teaches a pitch of 220 microns. Also, the electrode width is taught to be 60-70 microns. In such an embodiment, the spacing between ribs must be greater than 60 microns but less than 220. '553 teaches that it is undesired to deposit the phosphor paste on top of the barriers. Thus, the outlet holes should be smaller than the pitch. '553 teaches that screens with hole openings of 60 microns may be used to print other pastes (col. 19, lines 49-60). One of ordinary skill in the art would have expected to be able to use such a screen to print a phosphor paste with the expectation of success. In such a case, the diameter of

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the holes would be less than the spacing between the ribs. Both would be between 10 and 500 microns.

Claims 5-7: The number of holes depends on the size of the panel to be coated. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have determined the desired number of holes prior to coating.

Claim 21: The phosphor paste should contain 10-50 wt. % phosphor and may contain a resin binder and organic solvent. The relative concentrations of the thickener and solvent will necessarily affect the viscosity of the paste (and therefore the printing effectiveness) and the necessary drying time. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have optimized the concentrations of the phosphor, binder, and solvent to control the rheological properties and drying time of the process.

Claim 26: The phosphor height, width, and pitch and phosphor concentration are all result-effective variables, as discussed above. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have optimized the parameters to have controlled the resolution and rheological properties.

9. Claims 20 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over '553 as applied to claims 1 and 2 above, and further in view of Osaka et al. (U.S. Patent 5,277,840, hereafter '840).

'553 does not teach Applicant's specifically claimed ranges of the grain size, specific surface area, or paste viscosity.

'840 teaches that the particle size and viscosity of phosphor pastes are known to affect the light-emitting characteristics and resolution (col. 3, lines 8-39 and Abstract). The size distribution necessarily affects the specific surface area. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to have optimized the size distribution, specific surface area and paste viscosity of '553 for the best light-emitting characteristics and resolution.

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10. Claims 28 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over '553 as applied to claims 1 and 2 above, and further in view of Yamaura et al. (U.S. Patent 4,680,231, hereafter '231).

'553 does not teach the use of a photosensitive component in the phosphor paste. '231 teaches that phosphor pastes may include photosensitive components in order to perform further photolithographic processing. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to have included a photosensitive component in the phosphor paste of '553 in order to make the process more flexible by allowing further patterning by photolithography (for example, to remove, undesired material from the tops of the barrier ribs) (Abstract, col. 6, line 42-col. 7, line 10).

11. Claims 1-9, 11-17, 19, 21-22, 26-27, and 30-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nanto et al. (U.S. Patent 5,921,836, hereafter '836) in view of Shinoda '553.

'836 teaches a method of forming a plasma display panel using a paste applicator with a plurality of nozzles (and therefore a plurality of holes) to deposit a phosphor paste including an organic binder to form a phosphor layer on a substrate with a plurality of barrier ribs (col. 4, lines 16-39). The phosphors may be of three colors (red, green, and blue), applied as stripes, and dried (col. 1, line 58-col. 2, line 12). The dried films coat the substrate, anode, and sides of the barrier ribs. See, for instance, Fig. 1. The reference is silent as to the phosphor layer thickness, and therefore does not teach the thickness of the coating on the bottom (T1) and the side wall (T2).

However, '553 teaches that the thickness of the phosphor layer obtained after drying is a result-effective parameter and that there is a trade-off between brighter displays achieved by thicker layers and lower discharge initialization voltages necessary for thinner layers. '553 teaches that layers of 10-50 microns are preferred. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the method of '836 to

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have produced phosphor layer thicknesses of 10-50 microns. While there is no teaching regarding the ratio of the thickness of the layer on the bottom (T1) and the side wall (T2), any values independently chosen from the preferred range necessarily produce a ratio of $0.2 \leq T1/T2 \leq 5$.

Claim 3: '836 suggests using a substrate with a spacing S of 170 microns and D of 100 microns (col. 4, lines 36-39).

Claim 4: The applicator holes may be formed as nozzles (col. 4, lines 26-39).

Claims 5-7: '836 explicitly teaches that there may be 5-30 nozzles (col. 4, lines 26-39). However, given that there are many stripes to be formed (see, e.g., col. 8, lines 1-2), it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used more nozzles in order to have decreased processing time.

Claims 8, 13, 21, 26-27, and 30: '836 does not explicitly teach Applicant's claimed ranges of the outlet hole pitch, phosphor paste compositions or viscosities, barrier rib characteristics, and spacing between stripes. The resolution is affected by variables such as the distance between stripes of different colors, barrier height, width, and pitch. The viscosity of the paste is affected by the composition of the paste (col. 4, lines 16-20, col. 7, line 66-col. 8, line 19). The outlet hole pitch is determined by the rib pitch (col. 11, lines 41-59). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have optimized these characteristics for the desired resolution and paste thickness.

Claims 14-15: '836 does not explicitly teach Applicant's claimed multiple paste applicators. In the embodiment of Fig. 18, the pastes are applied in opposite directions. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have applied them both simultaneously with independent applicators and at the same speed to reduce the total processing time.

Claim 9: The hole pitch may be six times the barrier pitch (col. 11, lines 45-53).

Claim 11: '836 suggests a hole diameter of 100 microns (col. 4, lines 30-34).

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Claim 12: The clearance (distance between the nozzle tips and barrier top) should be kept constant. Typical values are 0.1-0.2 mm (col. 6, lines 3-13).

Claim 16: Each color phosphor paste may be applied and then dried separately (col. 1, line 58-col. 2, line 12).

Claim 17: The substrate and nozzle may be moved parallel to each other (col. 4, lines 49-53).

Claim 19: '836 does not explicitly teach Applicant's claimed order of application. The coating process begins outside of the region of effective display (col. 6, lines 35-41), apparently so that nonuniformities during the beginning of the deposition are not seen in the final product. By extension, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have continued movement beyond the effective region at the end of each stripe as well to prevent nonuniformities at the end of the process. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have begun moving the nozzle before deposition and stopped after deposition ceased in order to avoid nonuniformities in the effective region of the display panel.

Claim 22: The paste may contain ethyl cellulose (a binder resin) (col. 4, lines 16-20).

Claim 31: The top of the ribs may be colored black (col. 5, line 59-col. 6, line 2).

12. Claims 33, 35, 37-41, 43-44, 48-49, 51, 53-56, and 58 are rejected under 35 U.S.C. 103(a) as being unpatentable over '836 as applied to claims 1-2 above, and further in view of Ravi-Chandar et al. (U.S. Patent 5,656,574, hereafter '574).

'836 teaches the method of claims 1 and 2 as described above. '836 teaches an apparatus comprising a platform for fixing the substrate, a paste applicator with a plurality of holes, a supply means for supplying the paste to the applicator and a moving means to move the platform substrate and applicator relative to each other (col. 4, lines 8-56). The distance between the ribs and nozzle tips is kept constant (col. 6, lines 3-14). The apparatus has means to adjust the

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inclination degree of the applicator nozzles (col. 12, lines 40-49). '836 does not describe the use of outlet holes with a length/diameter ratio of 0.1-600.

The Examiner takes official notice that the length to diameter ratio of a nozzle for dispensing pastes is known to affect the rheological properties and therefore the dispensing efficiency of the nozzle. See, for instance, the extrusion process described in '574, col. 6, lines 40-49. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have optimized the length-to-diameter ratio of the paste applicator of '836 for the optimum rheological properties.

Claim 35: '836 suggests using a substrate with a spacing S of 170 microns and D of 100 microns (col. 4, lines 36-39). The shape of the holes is a design choice. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a non-circular nozzle with the expectation of similar results.

Claims 37-38: Figs. 15 and 16 suggest that the outlet holes are on the same plane and identical in form.

Claims 39-40: '836 suggests using 5-30 nozzles (col. 4, lines 34-37). However, given that there are many stripes to be formed (see, e.g., col. 8, lines 1-2), it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used more nozzles in order to have decreased processing time.

Claim 41: The hole pitch is determined by the pitch between the ribs, which is itself a cause-effective variable (col. 11, lines 45-53).

Claim 43: '836 suggests a hole diameter of 100 microns (col. 4, lines 30-34).

Claim 44: '836 teaches that the apparatus has sensors to detect the ribs and to adjust the substrate accordingly (col. 7, lines 8-32). Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to have positioned the nozzles above the centers of the grooves in order to evenly distribute the phosphor onto the barrier walls.

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Claim 49: Figs. 16 and 22 suggest a distribution system in which one storage section is used to dispensed paste to multiple nozzles. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used multiple nozzles to distribute the multiple phosphors simultaneously in order to reduce the processing times. In such an embodiment, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have three staggered sets of nozzles, each set with its own distribution system to supply different colored phosphors in order to reduce the processing time by applying all the stripes simultaneously.

Claims 48 and 58: Multiple applicators may be provided to apply the phosphors in series (Fig. 13).

Claim 51: The apparatus may have means to detect the position of the tips of the outlet holes and the tops of the barrier ribs (col. 6, lines 3-20) and controlling the area of application (col. 6, lines 3-50).

Claim 53: The apparatus has means to detect the position of the phosphor paste (col. 7, lines 24-32).

Claim 54-55: The apparatus comprises means to recognize alignment marks that determine the positions of the ribs and grooves (i.e., spaces) so that the phosphor may be deposited in the grooves (col. 5, line 48-col. 6, line 2).

Claim 56: Clogging of the nozzles may occur (col. 9, lines 59-62). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have included means to clean the nozzle to remove such clogs.

13. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nanto '836 in view of Shinoda '553 as applied to claim 1 and further in view of Ravi-Chandar '574 for the same reasons that it is applied to claim 33.

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14. Claim 50 is rejected under 35 U.S.C. 103(a) as being unpatentable over '836 in view of Ravi-Chandar '574 as applied to claim 33 and further in view of Mettenbrink (U.S. Patent 4,775,080, hereafter '080).

'836 and '574 are combined as described above. '836 also teaches that the apparatus comprises pressure adjusting and controlling means to dispense the paste (col. 7, lines 48-54). '836 does not teach that the pressure may be designed to be negative. However, clogging of the nozzle is taught as disadvantageous (col. 9, lines 59-62). It is well known to prevent the formation of dried beads of material that clog nozzles by applying a vacuum to the nozzle when the dispensing stops. As an example, '080 teaches the operation of a toothpaste dispenser, in which a vacuum is formed in the nozzle that avoids the formation of a plug of hardened paste outside the nozzle (col. 8, lines 33-40). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have allowed the adjusting means of '836 to apply a negative pressure to draw undispensed material back into the nozzle at the end of dispensing in order to prevent clogging of the nozzles.

15. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over '836 in view of '553 as applied to claim 1 above and further in view of '080 for substantially the same reasons as given for claim 50 above.

16. Claims 20 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over '836 in view of '553 as applied to claim 1 above and further in view of Osaka '840.

'836 and '553 do not teach Applicant's specifically claimed ranges of the grain size, specific surface area, or paste viscosity.

'840 teaches that the particle size and viscosity of phosphor pastes are known to affect the light-emitting characteristics and resolution (col. 3, lines 8-39 and Abstract). The size distribution necessarily affects the specific surface area. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to have optimized the size distribution, specific surface area and paste viscosity of '553 for the best light-emitting characteristics and resolution.

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17. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over '836 in view of '553 as applied to claim 1 above and further in view of Igarashi et al. (U.S. Patent 4,792,723, hereafter '723).

'836 teaches the method of claims 1 and 2 as detailed above, but does not teach the use of terpineol as the solvent for the paste. However, terpineol is a conventional paste solvent for phosphor pastes. See, for instance, '723, col. 3, line 50-col. 4, line 6. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used terpineol as the solvent of '836 with the expectation of similar results.

18. Claims 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over '836 in view of '553 as applied to claim 1 above and further in view of '231, and Mizuno et al. (U.S. Patent 5,466,325, hereafter '325).

'836 is described above. It does not teach that phosphor deposited on top of the barrier ribs are removed by an adhesive material. However, '553 explicitly teaches that phosphor is not desired on top of the barrier ribs of a plasma display panel (col. 12, lines 16-26). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have removed any phosphor accidentally deposited on top of the barrier ribs in the invention of '836. Further, '231 suggests the inclusion of a photosensitive material in a phosphor paste to allow photolithographic processing, as described in the rejection of claims 28 and 29 over '553 in view of '231, above. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used such a photolithographic process to have removed the undesired portions of the phosphor paste. In such a case, the phosphor paste acts like the photoresist of a conventional photolithographic process.

'325 teaches the patternwise removal of photoresist material from a substrate using a pressure-sensitive adhesive. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used an adhesive to remove the undesired portion

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of the phosphor paste in the embodiment suggested by '836, '553, and '231 with the expectation of similar results.

19. Claim 57 is rejected under 35 U.S.C. 103(a) as being unpatentable over '836 and '574 as applied to claim 33 above, and further in view of '553.

'836 and '574 teach the limitations of claim 33, but do not explicitly teach that the apparatus includes means to remove undesired deposits of phosphor paste. '553 explicitly teaches that phosphor is not desired on top of the barrier ribs of a plasma display panel (col. 12, lines 16-26). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have removed any phosphor accidentally deposited on top of the barrier ribs in the invention of '836.

20. Claims 45 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over '836 and '574 as applied to claim 33 above, and further in view of Silverbrook (U.S. Patent 5,850,241, hereafter '241).

'836 and '574 teach the limitations of claim 33, but do not teach that the nozzle is coated with a fluorine-based resin or amorphous carbon film. '241 teaches that ink-jet nozzles may be coated with hydrophobic films such as an amorphous carbon film (col. 38, line 66-col. 39, line 30) to prevent reaction between the nozzle and polar solvent-based inks. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a hydrophobically coated nozzle in order to deposit the paste of '836 when the desired paste uses a polar solvent as a vehicle to prevent interactions between the paste and the nozzle. '241 teaches amorphous carbon and fluorinated diamond films. The Examiner takes official notice that fluororesins are notoriously well-known hydrophobic coatings. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a fluorinated resin as the hydrophobic coating material with the expectation of similar results.

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Response to Arguments

21. Applicant's arguments filed 1/26/01 have been fully considered but they are not persuasive.

Regarding the rejections under 35 USC 112, 2nd paragraph, the Examiner maintains the rejections regarding claims 35 and 44 because the patentability of the apparatus as claimed depends on the position or features of the workpiece being acted upon. Applicant argues that the apparatus would not be used without a substrate without barrier ribs. The argument does not address the rejection. The apparatus may be used without such a substrate (e.g., a flat substrate) or with a workpiece in a different position. An amendment stating that the apparatus is capable of the uses of claims 35 and 44 would be considered.

Nanto '836 as primary reference:

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Applicant argues that '840 teaches away from '836 because it teaches screen printing the paste. The Examiner disagrees that such is a teaching away. While the primary reference teaches applying a paste from a nozzle, '840 teaches that the qualities of applied pastes, such as the grain size, specific surface area, and viscosity control the light-emitting characteristics and resolution. It does not appear that the properties that result from these features of the paste are affected by the manner in which the paste was applied.

Applicant argues that '574 is nonanalogous art and states that "it is not well-known *in the art of plasma displays* that the length to diameter ratio of a nozzle affects its dispensing efficiency." (Emphasis Examiner's). The argument is unconvincing. *Mueller Brass Co. v.*

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Reading Industries (176 USPQ 361, p. 369) states that in judging the level of ordinary skill in the art, it is the level of those who normally attack the problems of the art that counts; persons who do most of the problem solving in involved art are graduate engineers; as such they are chargeable with general knowledge concerning principles of engineering outside the narrow field involved and with the skills, ingenuity, and competence of the average professional engineer. Therefore, the level of one of ordinary skill in the art in the manufacture of EL devices, especially by the application of pastes, would necessarily include an understanding of the definition of the fundamental concepts of rheology and an understanding that the length to diameter ratio of a nozzle affects its dispensing efficiency. '574 is analogous art because it seeks to solve the same problem as that addressed both by Applicant and '836: that of dispensing pastes with cellulose binders. Because '836 teaches the dispensing of a paste with a cellulose binder through a nozzle, one of ordinary skill in the art would have been motivated to seek guidance addressing problems and solutions in the field of dispensing such pastes through nozzles. If it is Applicant's position that the effects of length-to-diameter ratio is not well known in the *art of applying pastes*, Applicant must so state for the record. '574 is merely cited as evidence of the Examiner's assertion. The Examiner chose the particular reference because it deals with dispensing powder pastes containing ethyl cellulose binders (the particular binder of '836). The fact that the particular application of '574 is the extrusion of a superconductor paste would not have obscured the well known physical principle that the aspect ratio of a nozzle influences the rheology of the paste flowing through it.

In response to applicant's argument that '080 is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, '080 seeks to solve the same problem faced both by Applicant and by '836: avoiding the formation of plugs of dried paste that can clog nozzles.

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Applicant argues that '723 teaches away from '836 because it teaches screen printing the paste.

The Examiner disagrees that such is a teaching away. While the primary reference teaches applying a paste from a nozzle, '723 teaches the use of terpeneol as a paste solvent. It does not appear that the terpeneol would lose its ability to act as a dispersing medium for phosphor pastes if applied from a nozzle rather than a screen.

In response to applicant's argument that '241 is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, '241 seeks to solve the same problem faced both by Applicant and by '836: printing media from nozzles. '241 warns that interactions between the nozzle and the printing material can be detrimental to the printing process. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made for a practitioner using the process of '836 using a polar solvent to have taken the same precautions recommended by '241.

Shinoda '553 as primary reference: Applicant argues that '553 does not teach a paste applicator with a plurality of holes because it teaches a screen printing device. The argument is unconvincing because a screen printing device is a paste applicator with a plurality of holes. Applicant argues that the claimed applicator is not merely a mesh screen. The argument is unconvincing because the phrase "a paste applicator with outlet holes" does not distinguish from a squeegee and a mesh screen.

Applicant argues that '553 does not recognize the width and pitch of the barrier ribs as result-effective variables. As the Examiner has stated, the width and pitch are understood in the art to control the resolution of the screen. If it is Applicant's position that it was wholly unknown at the time of the invention that the width and pitch of the barrier ribs affected the resolution of the screen, Applicant should affirmatively so state for the record.

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Applicant argues that '553 does not recognize the number of holes as result-effective variables. As the Examiner has stated, the number of holes is directly related to the size of the panel to be coated. Larger panels require larger screen and, therefore, more holes. If it is Applicant's position that it was wholly unknown at the time of the invention that the size of the screen, and thus, the number of holes, is determined by the size of the panel to be coated, Applicant should affirmatively so state for the record.

Applicant argues that '553 does not recognize the ratio of powder-to-binder resin as result-effective variables. As the Examiner has stated, the relative concentrations of the thickener and solvent will necessarily affect the viscosity of the paste (and therefore the printing effectiveness) and the necessary drying time. If it is Applicant's position that this relationship was wholly unknown at the time of the invention, and thus, Applicant should affirmatively so state for the record.

Applicant argues that '553 does not recognize the width and pitch of the barrier ribs as result-effective variables. As the Examiner has stated, the width and pitch are understood in the art to control the resolution of the screen. If it is Applicant's position that it was wholly unknown at the time of the invention that the width and pitch of the barrier ribs affected the resolution of the screen, Applicant should affirmatively so state for the record.

Applicant argues that '553 does not recognize the height of the barrier ribs as a result-effective variable. The argument is unconvincing because '553 teaches a rib height within Applicant's claimed range.

Applicant's argument that '553 does not teach the equation of claim 26 is not convincing in the absence of a showing of unexpected results comparing values outside and inside the claimed ranges because it would have been obvious to one of ordinary skill in the art at the time the invention was made to have optimized the pitch and width, as discussed above.

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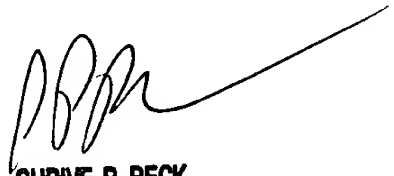
22. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Cleveland whose telephone number is (703)308-2331. The examiner can normally be reached on Monday-Friday from 8:30 a.m. to 4:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck, can be reached at (703) 308-2333.



Michael Cleveland

October 5, 2001



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